

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. Applicants respectfully request that the foregoing amendments be entered at least because they place the application in condition for allowance, or at least reduce the issues for appeal.

Claims 1 and 19-20 have been amended. Support for these amendments can be found at least in original claim 2, which has been canceled without prejudice or disclaimer. No new matter is being added. Claims 1 and 3-20 are pending.

Allowable subject matter

Applicants appreciate the indication that claims 8-11, 13-15, 17 and 18 contain allowable subject matter.

Rejections under 35 U. S. C. §§ 102 and 103

Claims 1-4, 7, 12, 19, and 20 stand rejected under 35 U. S. C. § 102 (b) as being anticipated by U.S. Patent No. 6,263,667 to Sawada et al. ("Sawada"). Claim 5 stands rejected under 35 U. S. C. § 103(a) as being unpatentable over Sawada in view of U.S. Patent No. 6,763,656 to Bidner et al ("Bidner"). Claim 6 stands rejected under 35 U. S. C. § 103(a) as being unpatentable over Sawada in view of U.S. Patent No. 6,477,832 to Surnilla et al. ("Surnilla"). Claim 16 stands rejected under 35 U. S. C. § 103(a) as being unpatentable over Sawada and Bidner in view of U.S. Patent No. 5,524,433 to Adamezyk, Jr. et al. ("Adamezyk"). These rejections are respectfully traversed for the reasons given below.

Independent claim 1, as amended, recites:

an abnormality determining section that executes an abnormality determination of the NO_x removing catalyst on the basis of output values of both of the first exhaust gas atmosphere detecting section and the second exhaust gas atmosphere detecting section from a time at which the output value of the first exhaust gas atmosphere detecting section is varied to a first predetermined value to a time at which the output value of the second exhaust gas atmosphere detecting section reaches a second predetermined value when the exhaust gas atmosphere varying section increases the ratio between the

reducing agent and the oxidizing agent in the exhaust gas, wherein the abnormality determining section calculates an integration quantity with respect to time of a difference between the output values of the first exhaust gas atmosphere detecting section and the second exhaust gas atmosphere detecting section and executes the abnormality determination of the NOx removing catalyst on the basis of the calculated integration quantity of the difference.

Thus, in claim 1, the abnormality determination of the NOx removing catalyst is executed on the basis of a calculated integration quantity with respect to time of a difference between the output value of the first exhaust atmosphere detecting section (upstream of the NOx removing catalyst) and the output value of the second exhaust atmosphere detecting section (downstream of the NOx removing catalyst) during an interval of time when the exhaust gas atmosphere varying section increases the ratio between the reducing agent and the oxidizing agent in the exhaust gas, i.e., during rich spike control.

Sawada discloses that the time period TSTR corresponds to the NOx occluding and reducing catalyst NOx absorbing capacity (col. 17, lines 14-16). The time period TSTR is determined as the difference between RCD and RCU (col. 17, lines 3-5), and is the period during which the exhaust air-fuel ratio at the downstream side of the NOx catalyst is held in the proximity of the stoichiometric air-fuel ratio in the rich spike control. The time period TSTR may be corrected based on a temperature correction factor KTCAT, and a flow rate correction factor KGA (col. 17, line 66 to col. 18, line 15).

Sawada, however, does not disclose executing the abnormality determination of a NOx removing catalyst on the basis of a calculated integration quantity with respect to time of a difference between the output value of the first exhaust atmosphere detecting section (upstream of the NOx removing catalyst) and the output value of the second exhaust atmosphere detecting section (downstream of the NOx removing catalyst) during rich spike control. The Office Action cites to Sawada at step 725 for disclosing this feature, which was incorporated from claim 2. Step 725 of Sawada, however, merely discloses that TSTR may be corrected based on a temperature correction factor KTCAT, and a flow rate correction factor KGA. These correction factors are not an integration quantity with respect to time of a

difference between the output value of an upstream exhaust atmosphere detecting section and the output value of a downstream exhaust atmosphere detecting section. The correction factors KTCAT and KGA are neither integrations over time, nor are they integrations of the difference between output values of upstream and downstream sensors. Sawada fails to disclose all the features of claim 1 for at least this reason.

Moreover, the use of the calculated integration quantity as in claim 1 in catalyst abnormality determination provides advantages not realized by Sawada. Paragraph [0070] of the present specification, discloses the use of calculated integration quantities in catalyst abnormality determination, where the influences of control error and control deviations given to rich spike control are eliminated and a stable abnormality determination is possible with high accuracy. Sawada failing to disclose the use of calculated integration quantities as recited in claim 1 in catalyst abnormality determination, fails to realize the advantages resulting therefrom.

Bidner, Surnilla and Adamezyk were cited for other features of the claims, but fail to cure the deficiencies of Sawada.

Independent claims 19 and 20 respectively recite “abnormality determining means for executing an abnormality determination of the NOx removing catalyst means on the basis of output values of both of the first exhaust gas atmosphere detecting means and the second exhaust gas atmosphere detecting means from a time at which the output value of the first exhaust gas atmosphere detecting means is varied to a first predetermined value to a time at which the output value of the second exhaust gas atmosphere detecting means reaches a second predetermined value when the exhaust gas atmosphere varying means increases the ratio between the reducing agent and the oxidizing agent in the exhaust gas, wherein the abnormality determining means calculates an integration quantity with respect to time of a difference between the output values of the first exhaust gas atmosphere detecting means and the second exhaust gas atmosphere detecting means and executes the abnormality determination of the NOx removing catalyst on the basis of the calculated integration quantity of the difference” and “executing an abnormality determination of the NOx removing catalyst on the basis of output values of both of the first exhaust gas atmosphere detecting section and

the second exhaust gas atmosphere detecting section from a time at which the output value of the first exhaust gas atmosphere detecting section is varied to a first predetermined value to a time at which the output value of the second exhaust gas atmosphere detecting section reaches a second predetermined value when the exhaust gas atmosphere varying section increases the ratio between the reducing agent and the oxidizing agent in the exhaust gas; calculating an integration quantity with respect to time of a difference between the output values of the first exhaust gas atmosphere detecting section and the second exhaust gas atmosphere detecting section; and executing the abnormality determination of the NOx removing catalyst on the basis of the calculated integration quantity of the difference", and thus are patentable for reasons analogous to claim 1.

The dependent claims depend from claim 1, either directly or indirectly, and are patentable for at least the same reasons, as well as for further patentable features recited therein.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741.

If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (202) 672-5414
Facsimile: (202) 672-5399

By Thomas G. Bilodeau

Richard L. Schwaab
Attorney for Applicant
Registration No. 25,479

Thomas G. Bilodeau
Attorney for Applicant
Registration No. 43,438